Hazardous Substances Emergency Events Surveillance 1996 Annual Report*

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The Hazardous Substances Emergency Events Surveillance (HSEES) system, established by the Agency for Toxic Substances and Disease Registry (ATSDR) in 1990, collects information on the direct public health impact of emergency events involving hazardous substances. Missouri's HSEES program has completed its third year of data collection. As the program continues, new notification sources are explored and information is shared and analyzed to determine the public health impact of emergency events involving the release of hazardous substances in the state of Missouri.

All Missouri HSEES data are transmitted to ATSDR for analysis and comparison along with the data collected from the other 13 participating states. Personal/company identifiers are not transmitted to ATSDR to protect the confidentiality of program participants.

Because the intent of the HSEES program is to reduce the morbidity and mortality related to hazardous substances emergency events, it is important that the public, emergency responders, employees and industries receive feedback information concerning case investigations. In those cases where development of intervention strategies might prevent similar future incidents, specific summary investigation reports are prepared and distributed to the community involved. When appropriate, health education programs to promote prevention strategies are conducted for the affected industry, local emergency planning committees, emergency responders, etc.

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Case Definition for Hazardous Substance Release

A hazardous substance release is entered in the HSEES system if it meets the following criteria:

1. An uncontrolled or illegal release or threatened release of one or more hazardous substances; and
2. The substances that are actually released or threatened to be released include ALL hazardous substances except petroleum products; and
3. The quantity of the hazardous substances which are released, or are threatened to be released, need (or would need) to be removed, cleaned up, or neutralized according to federal, state or local law; or
4. Only a threatened release of hazardous substances exists, but this threat leads to an action such as an evacuation that can potentially impact on the health of employees, responders or the general public. This action makes the event eligible for inclusion into the surveillance system even though the hazardous substances are not released.

Analysis of Data on Hazardous Substances Emergency Events

The Missouri Department of Natural Resources' Environmental Services Program maintains Environmental Emergency Response (EER) reports. All environmental emergencies are to be reported, 24 hours a day, to (573) 634-2436. A total of 1,715 reports were received in 1996 (January 1 through December 31, 1996). Of these, 862 (50%) were petroleum related. There were 200 (12%) potential hazardous substances emergency events. The remaining 653 (38%) incidents involved releases of sewage, solid waste, nonhazardous substances, non-emergency releases, etc. A hazardous substance release is entered into the HSEES system only if it meets the case definition for a hazardous substance release. See sidebar.

In addition, the HSEES program receives fax reports from the United States Coast Guard's National Response Center (NRC) on a daily basis. A total of 91 potential hazardous substances emergencies in Missouri were reported through this source. Of these 91 reports, 23 (25%) met the HSEES case definition and were entered in the HSEES database. Other notification sources include reports from the Missouri Highway Patrol, the Missouri Occupational Fatality Assessment and Control Evaluation Program (MOFACE) and the media.

Of the 298 events received from all sources and investigated by the HSEES Coordinator, 178 were entered into the

HSEES database. Only 161 (90%) of those events met the case definition and were counted in 1996. Fourteen (8%) of the investigations entered were events that occurred in 1995, and three events did not meet the case definition.

The 161 events involved the release of 177 hazardous substances. The majority of events (150/93%) involved the release of only one hazardous substance. The most commonly released substance was ammonia with 34 (21.1%) releases; followed by PCB's and sulfuric acid with 10 (6.2%) releases, each; paint with 7 (4.3%) releases; and ethylene glycol, hydrochloric acid, nitric acid and nitrogen with 6 (3.7%) releases, each.

Events occurred throughout the state, involving 54 counties and St. Louis City. This represents slightly under 50% of the counties of the state. Figure 1 shows the number of events occurring in each county.

One hundred ten (68%) of the events occurred at fixed facilities, while 51 events (32%) were transportation related. Of the 161 events, 140 (87%) occurred on weekdays. Twenty-one events (13%) occurred on the weekend. Slightly over half the events, 92 (57%), occurred between 6 a.m. and 6 p.m., with 67 (42%) occurring between the core working hours of 8 a.m. and 5 p.m., Monday–Friday. Eighteen (11%) occurred between midnight and 6 a.m. and 29 (18%) occurred between 6 p.m. and midnight. Time of event was unknown for 22 (14%) events.

Evacuations were ordered in 12 (7.5%) events. The number of people evacuated was known for eight events and unknown for four events. The eight known events resulted in 1,830 people being evacuated. In any single evacuation, the largest number of known people evacuated was 1,200 and the smallest number was five. Six of the evacuations involved the evacuation of affected building(s) or part of the building, five were downwind evacuations and one was a combination circle/downwind evacuation.

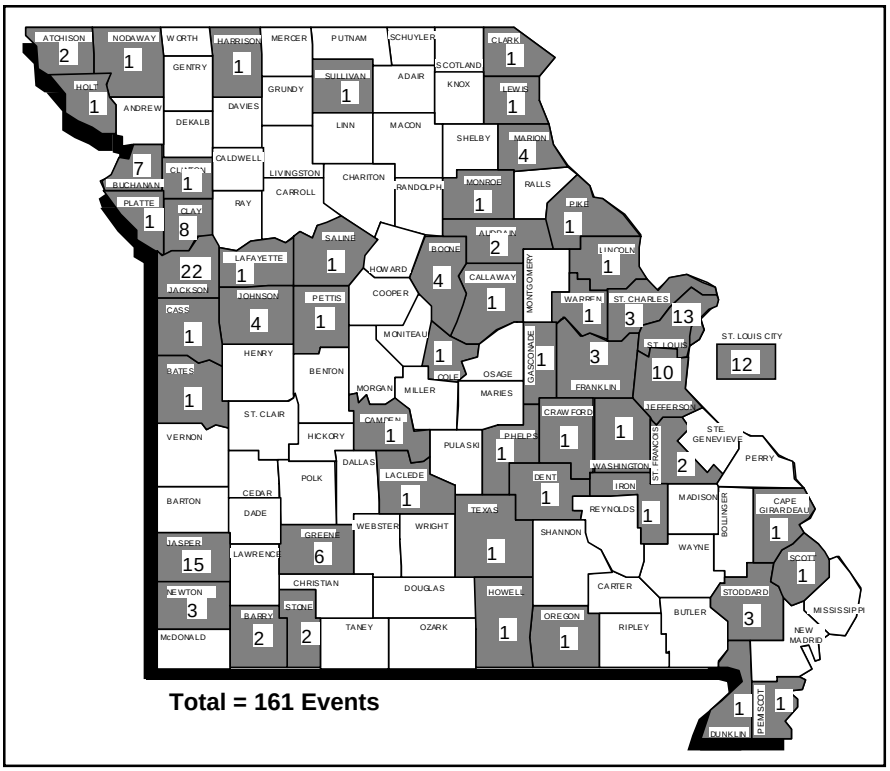

Figure 1. Location of non-petroleum hazardous substances emergency events by county, Missouri, 1996.

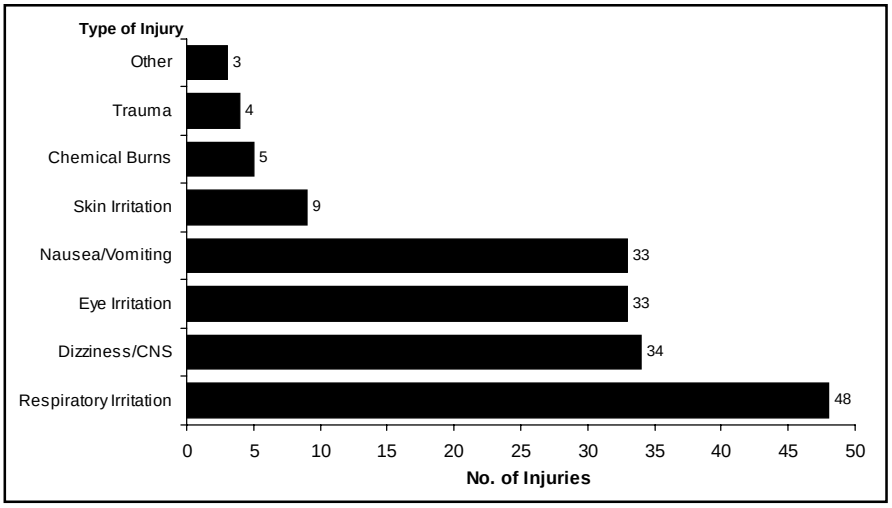

Figure 2. Number of injuries reported by type, Missouri HSEES, 1996.

A total of eight hazardous substances were released in the 12 events involving evacuations. Ammonia was the most commonly released substance, occurring in six events involving a total of 1,275 known evacuees. Chlorine was released in two events involving a total of 340 known evacuees. Nitric acid and potassium hydroxide were released in one event involving 200 evacuees, hydrogen sulfide was released in one event involving ten evacuees and methyl mercaptan was released in one event involving five evacuees. Toluene and dimethyl sulfide were released in one event involving an unknown number of evacuees.

Twelve (7.5%) events resulted in 59 victims, including two deaths. The largest number of victims associated with a release was 29. The most common type of injury reported was respiratory

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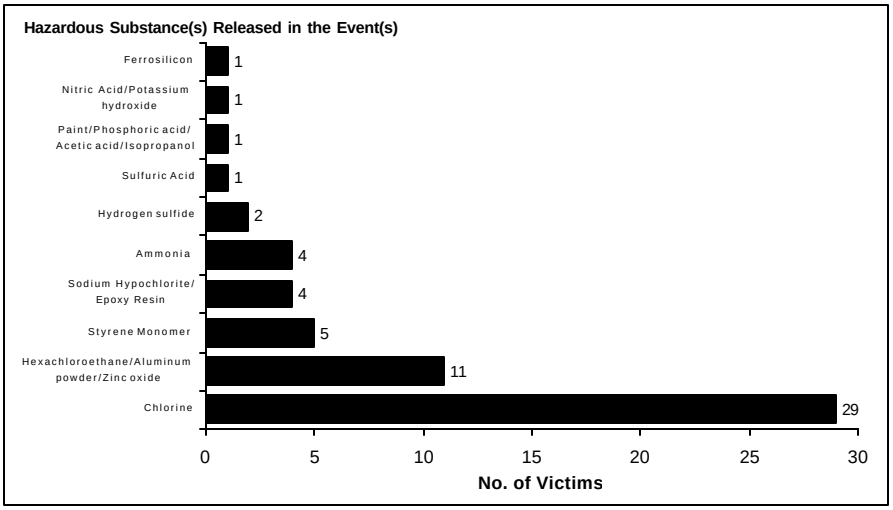

Figure 3. Number of events involving victims by hazardous substance released, Missouri HSEES, 1996.

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irritation, which occurred in 48 (81%) of the victims. Other types of injuries/ symptoms included eye irritation, chemical burns, thermal burns, skin irritation, dizziness/CNS, nausea/ vomiting, trauma and other. See Figure 2.

Of the 59 victims, two victims died, 20 were treated at the scene, 13 were transported to a hospital but not admitted, and 24 were admitted to a hospital. The two deaths occurred in two separate transportation-related events, and it could not be determined if the deaths were attributable to the hazardous substances released (styrene monomer and ferrosilicon) or the trauma of the accident.

Employees were the largest group injured by hazardous substances releases again this year. Forty-nine employees, three responders, one police officer and four members of the general public were injured. Two employees died. A chlorine release in a paint booth resulted in 29 (49%) injuries. In one event, a malfunction in the training equipment during a fire drill caused a release of hexachloroethane, aluminum powder and zinc oxide that resulted in 11 (19%) injuries. Styrene monomer was involved with five (8%) injuries in one event. Ammonia was involved with four (7%) injuries in three events. In another event, a release of sodium hypochlorite and epoxy resin resulted in four (7%) injuries. Hydrogen sulfide was involved with two (3%) injuries in one event. The remaining hazardous substances were involved with one injury, each. See Figure 3.

Reporting Events

We are indebted to the Missouri Department of Natural Resources' Environmental Services Program for helping us investigate these hazardous substances emergency events. We rely heavily on this unit for notification of releases and frequently contact them for circumstances surrounding a release.